

The background is a complex digital composition. It features a dark blue and teal color palette. Overlaid on this are various geometric patterns, including wireframe cubes and spheres, and a network of glowing lines connecting points. Binary code (0s and 1s) is scattered throughout, particularly in the lower right quadrant. The overall effect is one of high-tech connectivity and data flow.

THE TRUE 5G REVOLUTION

THE GEORGE GILDER REPORT

The True 5G Revolution

The internet is much more than a place to find information. It's a gathering place where you can be amazed and entertained, catch up with friends, glom on to the latest gossip, and maybe, just maybe, buy something while you're at it.

In essence, it's the electronic version of market day in old European towns...

Or a bazaar in the Middle East... an American county fair... the Roman forum... the Mall of America... that line of little shops in the tourist town by the sea...

It's the ability to *buy* that is crucial, but it cannot be cold. A bazaar must be a community, but it could never be a free community. Somebody has to pay the rent, smiling.

On the internet, the rent is paid in bandwidth.

Now, US politicians have never quite recovered from the legacy of broadcast TV and radio. They continue to treat bandwidth as a scarce resource, like waterfront property.

"We can't make any more of it," they moan.

Far from a natural resource, bandwidth is wholly a product of human ingenuity and effort. It can be multiplied practically infinitely, not by powering up as in the days of "50,000-watt clear channel!" radio, but by powering down and multiplying transceivers.

This is the essence of the 5G revolution in next generation wireless.

5G, or fifth generation wireless technology, is often depicted as the route to the internet of things (IoT), autonomous automobiles, internet virtual reality, battlefield AI, and new security models.

And for all the talk about spectrum allocations and machinations, there is only one crucial issue in wireless and 5G: Whether the US continues to

allocate exclusive bands of spectrum to the winners of the auction.

The Price the West Makes You Pay to Play

You see... spectrum auctions impose a major tax on US telecom, now totaling close to \$150 billion, that is not exacted in China.

It reserves the next generation for the incumbent leviathans with obsolescent technology and suppresses entrepreneurial progress and invention in the field.

The result is an obsessive drive by companies such as AT&T and Verizon to “harvest” the existing spectrum by producing “content,” as if anyone would choose phone companies to make their movies.

To play in the auctions, for example, AT&T sold off its Western Electric telecom equipment operations, leaving the field to Huawei and other foreign manufacturers. Verizon bought the Huffington Post, as if you want to get your news from a phone company.

Spectrum is in any way naturally scarce. The industry would move “up spectrum” toward the boundless realms of microwave and even infrared. Steady improvement of their master of “smart radios” and software-defined radios will allow users everywhere to share the spectrum as they do in Wi-Fi.

You see, back in 1993, I predicted that in the future, most connections would migrate to the unlicensed bands of the spectrum that are not subject to auction and exclusive use. ISM bands, so called for their industrial, scientific, and medical applications, are unlicensed and also accomodate Wi-Fi.

Today, perhaps half of all phone and data calls do not go through the licensed bands of spectrum, but the ISM channels.

So the crucial issue in 5G becomes whether enough unlicensed spectrum is reserved, so that the massive move away from the auctioned spectrum continues.

The Importance of ISM Bands

The most important allocations of this spectrum come not through the auctions but the allocation of bands up to 300 gigahertz microwaves and even infrared.

David Medved, late Israeli physicist, was a veteran of fiber optic companies that use infrared light in crystalline silica strands — so long and so pure you could see through 40 miles of it.

His company Jolt used similar infrared through the air for campus and building to building links. He also explored the use of ultraviolet for battlefield communications.

The spectrum is not limited...

It is essentially infinite.

The allocation of specific bands is decelerating the advance of software-defined smart radios that can survey the spectrum and send signals to unused air.

The chief threat of 5G to the US is not China. It's our regulators who are intoxicated by auction revenues and are stultifying American telecom.

Now, Medved, like me, was a spectrum maximalist and cornucopian. He denied the usual depictions of the airwaves as a rare and limited commodity — waterfront property. He did not imagine that spectrum as a scarce resource that would have to be husbanded by the government and sold off at auctions to the highest bidders.

In fiber optics, the industry moved to the 1550 nanometer band because it combined low attenuation and low absorption and enabled convenient lasers. But fiber optics only uses an infinitesimal span of waves.

Today, some fear-mongers suggest that 5G high frequencies pose a health threat. But as David Medved told me years ago, if you expose yourself to the sun, you receive far more radiative energy than is emitted by infrared or microwave spectrum. Any airplane pilot receives vastly more high energy radiation than anyone near a 5G cell tower.

Visible light from the sun will damage your eyes if you stare into it. Therefore, the government imposes a SAR (specific absorption rate) that

prevents the use of visible light and contiguous frequencies that affect your eyes.

These requirements affect many industries beyond cell phones. SAR means that most LIDAR (light detecting and ranging systems) for vision in self-driving cars have to operate at low power. This both limits their reach and expands the number of transceivers needed to 64 or 128 on each car.

As China shows, without a \$150 billion auction tax, people can innovate more readily in the use of spectrum.

Rather than a chimerical campaign against Huawei for taking the lead in 5G, perhaps the US should stop taxing and stultifying its telecom companies.

Our True Path to 5G

As Nobel laureate physicist Richard Feynman observed, James Clerk Maxwell's discovery of the unity of the electromagnetic spectrum, governed by the speed of light, was the most important event of the mid-19th century, leaving the US civil war of the same year as "a parochial footnote by comparison."

Today, in the form of 5G wireless, Maxwell's rainbow of frequencies continues to reanimate the global economy.

With calls using low definition voice and taking some three kilohertz apiece, mobile wireless today is mostly confined to some 600 MHz of frequencies. That's roughly 200,000 calls per cell. These bands are mostly in the low (sub gigahertz) and mid-frequency bands.

But as Maxwell and Medved proved, frequencies are infinite and cornucopian in their uses. 5G is opening up what my former colleague Bret Swanson of AEI calls a "spectrum big-bang." Wireless spectrum, he says, could grow by a factor of 10 during the next decade.

Governments still want to control the spectrum, and engineers could not figure out how to use it effectively without the guidance of Federal commissioners and politicians. They auction it off to the most powerful companies for exclusive use, collecting tolls on the air. And then they harass and regulate the companies as potential monopolists of air.

In Israel, the use of the electromagnetic spectrum thrives. For almost two decades I have been following several companies pursuing the grail of software defined or “cognitive” radios that can range across the spectrum and find empty stretches to use. Look Ma, no need for auctions or regimented air.

I have predicted the steady movement of data calls and communications from licensed to unlicensed spectrum, the ISM bands.

Over the next several years this movement will accelerate and auctions will be obsolete.

5G will as much as double, by more than a gigahertz, the amount of bandwidth currently available in the unlicensed bands of spectrum. Communications will migrate away from the toll lanes into EZ pass realms of relatively unregulated carriers.

That being said, there’s one company that I’ve officially recommended to my readers...

Qualcomm, Inc. (QCOM)

The company supports more than 25 purpose-built and mass-market platforms for IoT. Qualcomm’s IoT solutions, which are also 5G, give industrial manufacturers around the world new flexibility and efficiency they did not have previously.

Not only that, but as Qualcomm partners with Tencent to collaborate on 5G and gaming devices, it is opening the door to the IoT and a plethora of new connected device markets.

Action to take: Buy QCOM at market.

We welcome comments, suggestions, and customer service inquiries at feedback@threefounderspublishing.com. You can also call (844)-449-6520. Please note: The law prohibits us from giving personalized financial advice.

© 2020 Three Founders Publishing. All rights reserved. Any reproduction, copying, or redistribution of this report, in whole or in part, is strictly prohibited without written permission from Three Founders Publishing. Three Founders Publishing forbids its writers from having a financial interest in any security they recommend. All employees of Three Founders Publishing, other than writers, must wait 24 hours after a recommendation is published before acting on that recommendation.

Three Founders Publishing does not recommend or endorse any brokers, dealers, or advisors. This work is based on SEC filings, current events, interviews, corporate press releases, and our own personal networks. It may contain errors, and you shouldn't make any financial decisions based solely on what you read here.
